

Christopher S. Boxe

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Education

- Ph.D.** Environmental Science and Engineering, **Minor** in Geology, California Institute of Technology Jun. 2005
Dissertation Title: Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice
Thesis Advisor: Professor Michael Hoffmann
- M.S.** Environmental Science and Engineering, California Institute of Technology Jun. 2002
- M.S.** Planetary Science, California Institute of Technology Jun. 2001
- B.S.** Chemistry, **Minor** in Math, *magna cum laude* Morehouse College May 1999
- Phi Beta Kappa Honors**, Morehouse College Mar. 1998

Experience

- Jet Propulsion Laboratory Research Scientist, NASA-JPL** Oct. 2008 – present
Interdisciplinary focus on regional and global biochemical and physical evolution of planets on geological and shorter timescales by modeling, laboratory, and remote sensing techniques.
- African American Resource Team (AART), Jet Propulsion Laboratory** Nov. 2008 – present
Contributing to JPL's Diversity Programs Initiative, which seeks to foster an inclusive environment, where the differences and similarities of individuals are valued and respected, ensuring full utilization of the talents and capabilities of our diverse workforce.
- Jet Propulsion Laboratory Postdoctoral Scholar, NASA-JPL** Jan. 2008 – Oct. 2008
Postdoctoral matriculation in the Planetary Science and Life Detection Group in JPL's Earth and Space Science Division. Conducting a quantitative budget analysis of nitrogen, carbon, and water on Mars, Earth, and Venus via numerical modeling techniques to gain insight into their comparative evolution. In parallel, several projects are being conducted to investigate the possible effects of heterogeneous photochemistry on the Martian atmosphere and the effect of implementing new gas phase CO₂-related and HNO₃-related chemical reactions; these investigations are being done by coupled 1-D and multiphase modeling techniques.
- Jet Propulsion Laboratory Speakers Bureau, NASA-JPL** 2008 – present
On a voluntary basis gives scientific presentations basis to elementary schools and professional organizations about work done at JPL.

- Caltech Consulting Club Volunteer** 2008 – present
Participates in focus sessions for consulting firms to provide statistical consumer behavior data.
- Arctica Research Project for Urban Youth, NASA-JPL** 2007 – present
Collaborative practical science projects and field trips with a multitude of select elementary, junior high, and high schools in Los Angeles with the main goal of gearing underrepresented peoples towards the hard sciences (*i.e.*, with a special emphasis on Earth and Space Sciences).
- Oak Ridge Associated Universities/ NASA Postdoctoral Program Fellow, NASA-JPL** 2006 – 2008
Postdoctoral matriculation in the Lab Studies and Modeling Group in JPL's Earth and Space Science Division. Involved in planetary ice surface evolution, cirrus cloud chemistry and microphysics, and modular multiphase modeling. Particle size determination used to quantify relative ages of the surfaces of icy moons. Secondly, using spectroscopic techniques, investigated the interaction of trace gases on cirrus clouds. Thirdly, along with another postdoctoral scholar, created the first multiphase modular model to study trace pollutant effects on air quality and snow/ice chemistry in the polar regions.
- Program Assistant, Caltech MURF (Minority Undergraduate Research Fellows)** 2001 – 2006
Organized academic and social activities for undergraduates during the summer research program.
- Environmental Science and Engineering Graduate Research Assistant, Caltech** 2001 – 2005
Elucidation of physicochemical, photochemical, and kinetic pathways for nitrogen oxide industrial pollutants in the polar regions. Specifically, I investigated such phenomenon through laboratory techniques utilizing: wet chemical analysis, oxygen and nitrogen isotopic analysis via multiple collector mass spectrometry, laser-induced fluorescence spectroscopy, two-photon laser-induced fluorescence spectroscopy, and NMR spectrometry. These investigations were carried out at Caltech in collaboration with faculty at Georgia Tech, University of California San Diego, and University of California Berkeley.
- Instructor, Caltech YESS (Young Engineering and Science Scholars)** 2001 – 2001
Taught high school students the practical uses and benefits of utilizing wind turbines and the fundamental physics governing how they operate.
- Geology and Planetary Science Graduate Research Assistant, Caltech** 1999 – 2001
1-D photo-chemical modeling of extrasolar planetary atmospheres and putative infrared quantum-mechanical calculations relevant to terraforming the Martian atmosphere with super greenhouse gases.
- Voluntary Teaching at Los Angeles High Schools** 2006
Taught high school students elementary chemistry governing the production of smog in urban environments.
- Graduate Student Recruiter, Caltech/NASA-JPL** 1999 – present
Recruited graduate students for Caltech's graduate program.

Research Assistant, Morehouse College

1997 –1999

Extracted essential oils from the plant species *Origanum vulgare* by means of carbon dioxide (CO₂) extraction.

NASA-McNair Research Assistant, Morehouse College

1997 – 1999

Investigated molecular nitrogen (N₂) and molecular hydrogen (H₂) adsorption and absorption on aluminum oxide (Al₂O₃) surfaces via diffuse reflectance infrared fourier transform (DRIFT).

(25). Atmospheric Chemistry on Mars Revisited

C. S. Boxe*, J. S. Francisco, * A. Saiz-Lopez, F. Lefevre, F. Forget, H. Nair, M. Allen, Y. L. Yung, and S. P. Sander
Science, in submission.

(24). Validation of Tropospheric Emission Spectrometer (TES) nadir stare ozone profiles using ozonesonde measurements at mid-to-high latitudes during Arctic Research on the Composition of the Troposphere from Aircraft and Satellite (ARCTAS)

C. S. Boxe, J. Worden, G. Osterman, and A. Elderling, D. Tarasick, A. Thompson, and S. Oltmans.
Journal of Geophysical Research-Atmospheres, in submission.

(23) Photochemical Laboratory Studies of Organic and Inorganic Molecules on Ice and Snow Crystals Relevant to Polar Chemistry

C. S. Boxe, M. I. Guzman, A. Grannas, M. R. Hoffmann, P. B. Shepson, W. Simpson, and R. Honrath
Chemical Reviews, proposal accepted-manuscript in preparation for submission.

(22). Limits for Thin Liquid Films on Mars and Their Implications

C. S. Boxe*, K. P. Hand*, K. Neelson, A. Saiz-Lopez, M. I. Guzman, A. S. Yen, Y. L. Yung, M. Allen, S. Sander, and C. Sotin
Proceedings of the National Academy of Sciences of the United States of America, in submission.

(21). Influence of thin liquid layers on polar ice chemistry: implications for Earth and planetary science

C. S. Boxe* and A. Saiz-Lopez*
Polar Science, in press.

(20). A mechanism for biologically-induced iodine emissions from sea-ice

A. Saiz-Lopez*, C. S. Boxe*, R. Sander, and L. Carpenter
Atmospheric Chemistry and Physics-Discussions, in press.

(19). Multiphase modeling of nitrate photochemistry in the quasi-liquid layer (QLL): implications for NO_x release from the Arctic and coastal Antarctic snowpack

C. S. Boxe* and A. Saiz-Lopez*
Atmospheric Chemistry and Physics, Volume 8, 4855-4864 (2008).

(18). Multiphase modeling of nitrate photochemistry in the quasi-liquid layer (QLL): implications for NO_x release from the Arctic and coastal Antarctic snowpack

C. S. Boxe* and A. Saiz-Lopez*
Atmospheric Chemistry and Physics-Discussions, Volume 8, 6009-6034 (2008).

(17). A mechanism for biologically-induced iodine emissions from sea-ice

A. Saiz-Lopez* and C. S. Boxe*
Atmospheric Chemistry and Physics-Discussions, Volume 8, 2953-2976 (2008).

(16). An overview of snow photochemistry: evidence, mechanisms and impacts

A. M. Grannas, A. E. Jones, J. Dibb, M. Ammann, C. Anastasio, H. J. Beine, M. Bergin, J. Bottenheim, C. S. Boxe, et al.,
Atmospheric Chemistry and Physics, Volume 7, 4165--4283 (2007).

(15). A Review of Snow Photochemistry: evidence, mechanisms, and impacts

A. M. Grannas, A. E. Jones, J. Dibb, M. Ammann, C. Anastasio, H. J. Beine, M. Bergin, J. Bottenheim, C. S. Boxe, et al.,
Atmospheric Chemistry and Physics-Discussions, Volume 7, 4329-4373 (2007).

(14). Grain Sizes and Surface Areas, and Porosities of Vapor-Deposited H₂O Ices Used to Simulate Planetary Icy Surfaces

C. S. Boxe, Leu, M. T., Bodsgard, B. R., and W. Smythe
Journal of Colloid and Interface Science, Volume 309, Issue 2, Pages 412-418, MAY 15 (2007).

(13). Acidity of Frozen Electrolyte Solutions

C. Robinson, C. S. Boxe, M. I. Guzman, A. J. Colussi, and M. R. Hoffmann
Journal of Physical Chemistry B, 110 (15): 7613-7616 APR 20 (2006).

(12). Kinetics of Gaseous NO and NO₂ Evolution from Illuminated Frozen Nitrate Solutions

C. S. Boxe, A. J. Colussi, M. R. Hoffmann, I. Perez, J. G. Murphy, and R. C. Cohen
Journal of Physical Chemistry A, 110 (10): 3578-3583 MAR 16 (2006).

(11). Photochemical Production and Release of Gaseous NO₂ from Nitrate-doped Water Ice

C. S. Boxe, A. J. Colussi, M. R. Hoffmann, J. Murphy, P. Wooldridge, T. Betram, and R. C. Cohen
Journal of Physical Chemistry A, 109 (38): 8520-8525 SEP 29 (2005).

(10). Oxygen Isotopes Fractionation in the Photodecomposition of Nitrate in Water and Ice

J. McCabe, C. S. Boxe, A. J. Colussi, M. R. Hoffmann, and M. Thiemens.
Journal of Geophysical Research-Atmospheres, Vol. 110, No. D15, D15310, 10.1029/2004JD005484, 13 August (2005).

(9). Multiscale Ice Fluidity in NO_x Photodesorption from Frozen Nitrate Solutions

C. S. Boxe, A. J. Colussi, M. R. Hoffmann, D. Tan, J. Mastromarino, A. T. Case, S. T. Sandholm, and D. D. Davis
Journal of Physical Chemistry A, 107 (51): 11409-11413 DEC 25 (2003).

(8). Monotonic Increase of Nitrite Yields in the Photolysis of Nitrate in Ice and Water between 238 and 294 K

Y. Dubowski, A. J. Colussi, C. S. Boxe, and M. R. Hoffmann
Journal of Physical Chemistry A, 106 (30): 6967-6971 AUG 1 (2002).

(7). Keeping Mars Warm with New Super Greenhouse Gases

M. F. Gerstell, J. S. Francisco, Y. L. Yung, C. S. Boxe, and E. T. Aaltonee
Proceedings of the National Academy of Sciences of the United States of America, 98 (5): 2154-2157 FEB 27 (2001).

Publications (*in prep* – *top priority*) *Indicates co-first authors

(6). Aura Satellite Observations and GEOS-Chem Model Simulations of the December 2006 Australian Fires

M. Luo, C. S. Boxe, J. Jiang, R. Nassar, J. Logan, and N. Livesey
Atmospheric Chemistry and Physics, in preparation.

(5). Global and Regional-Scale Analysis of New HNO₃(g) Production Channel on Earth: 1-D and 3-D model simulations

C. S. Boxe, C. Shim, P. Hamer, Y. Choi, J. Thomas, J. Stutz, S. Sander, and Y. Yung
Nature Geoscience, in preparation.

(4). VUV Spectral Analysis of Organic Hydrocarbons on Titan's Surface

C. S. Boxe,* R. Hodyss,* P. Johnson, and I. Kanik
Nature Geoscience, in preparation.

(3). If you are wondering what God looks like...

Authored by Kevin Chancy, Edited by C. S. Boxe*
Book, in final stages of preparation.

Publications (*in prep, in submission, or in review* – *lower priority*) *Indicates co-first authors

(2). A Review of Lab Studies Simulating Radiation Bombardment on Planetary Icy Surfaces

C. S. Boxe, G. Orzechowska, P. V. Johnson, R. P. Hodyss, A. Saiz-Lopez, I. Kanik, and Y. L. Yung
Annual Review, in preparation.

(1). Modeled-Derived True Surface NO_x Fluxes from the Snowpack

H. J. Beine, A. Saiz-Lopez, and C. S. Boxe
Geophysical Research Letters, in preparation.

Invited Talks, Conference Papers, Poster Presentations, & Outreach Activities

C. S. Boxe, Annual Donator to Classical KUSC 91.5 fm radio broadcast service of the University of Southern California.

C. S. Boxe, Earth Scientist Volunteer at JPL's Open House, Education Office, May 2nd-3rd, 2009.

C. S. Boxe, "The Role of Thin Liquid Films and Their Implications," Guest Lecture for Geobiology/Astrobiology course at USC's Earth Science Department, April 28th, 2009.

C. S. Boxe donated honorarium received from guest speaker for Earth Day at Citrus College's Center For Initiative (CFI), "Global Warming: Fact, Myth, or Hypothesis," Glendora, CA April 22nd, 2009 to Armory's Center for the Arts City of Pasadena Greening the Earth Day & the Armory's Family Festival, April 25th, 2009.

C. S. Boxe (with honorarium), Invited guest speaker for Earth Day at Citrus College's Center For Initiative (CFI), "Global Warming: Fact, Myth, or Hypothesis," Glendora, CA April 22nd, 2009.

C. S. Boxe and C. Paterson, Invited guest speakers Arts Center Open Science Center Salon, "Up in the Air: constraints for life on Mars sought through atmospheric models and thermodynamic calculations," at University of California, Broad Art Science Center and Lab, Los Angeles CA, April 17th, 2009.

C. S. Boxe, Invited guest speaker for "Career and Life Planning" at Citrus College, Citrus College, Glendora, CA, March 19th, 2009.

C. Paterson and C. S. Boxe, "Life as We Know It?" Birth/Day: Origins, Temporality, Hybridity – 'How does newness come into the world? How is it born? Of what fusions, translations, conjoining is it made?' Salman Rushdie, The Satanic Verses, Visual Studies Conference, University of California, Irvine, CA, March 6-7th, 2009.

C. S. Boxe, "Validation of Tropospheric Emission Spectrometer (TES) nadir stare ozone profiles using ozonesonde measurements during Arctic Research on the Composition of the Troposphere from Aircraft and Satellites (ARCTAS)," 26th Informal Symposium on Kinetic and Photochemical Processes in the Atmosphere, University of California, Riverside, CA, March 5th, 2009.

C. S. Boxe, "Validation of Tropospheric Emission Spectrometer (TES) nadir stare ozone profiles using ozonesonde measurements during Arctic Research on the Composition of the Troposphere from Aircraft and Satellites (ARCTAS)," TES Science Team Meeting, The University Corporation for Atmospheric Research (UCAR) – National Center for Atmospheric Research (NCAR) Foothills Laboratory, February 23-25th, 2009.

C. S. Boxe, "Applications of Ice Photochemistry to Earth Science Problems," Ice Labs Workshop, NASA-JPL, February 2nd, 2009.

C. S. Boxe, "Validation of Tropospheric Emission Spectrometer (TES) nadir stare ozone profiles using ozonesonde measurements during Arctic Research on the Composition of the Troposphere from Aircraft and Satellites (ARCTAS)," ARC-IONS Data Workshop, Wycliffe College, University of Toronto, January 7-8th, 2009.

C. S. Boxe, "Chemistry of Ice and Snow: implications for planetary science," Harvard's Engineering and Applied Sciences Atmospheric Sciences Seminar, October 24th, 2008.

C. S. Boxe, "Academic Career Path," Morehouse College's Ronald E. McNair Scholars, Atlanta, Georgia, October 7th, 2008.

C. S. Boxe, "Heterogeneous Snow Chemistry and its Relation to finding life on Mars," Morehouse College's Chemistry Department, Atlanta, Georgia, October 7th, 2008.

C. S. Boxe, "Academic Career Path – Self-Empowerment Through Research," Keynote Speaker for Morehouse College's 3rd Annual Research – Enrichment Awards, Atlanta, Georgia, October 6th, 2008.

C. S. Boxe, "Heterogeneous Snow Chemistry," Morehouse College's Math Department, Atlanta, Georgia, October 6th, 2008.

C. S. Boxe, "Academic Career Path," Morehouse College's Chemistry Department, Atlanta, Georgia, October 6th, 2008.

C. S. Boxe, "Academic Career Path," Morehouse College's Biology Department, Atlanta, Georgia, October 6th, 2008.

C. S. Boxe, "Climate Change: Fact or Fiction?" Camp Mariposa Girl Scouts, Altadena, California, September 30th, 2008.

C. S. Boxe, "Academic Career Path," The Scientific Empowerment Movement (SEM), UCLA, Los Angeles, California, September 27th, 2008.

C. S. Boxe, "The Academic Career Path," Mt. San Antonio College's Inland Valley Black College Summit, Industry, California, September 13th, 2008.

C. S. Boxe, A. Saiz-Lopez, A. S. Yen, M. I. Guzman, Y. L. Yung, M. Allen, C. Sotin, Heterogeneous Photochemistry on Mars's Surface," Earth and Space Science Division, Jet Propulsion Laboratory, NASA-JPL's Postdoctoral Research Day, August 26th, 2008.

C. S. Boxe, "Possible Environments for Life on Mars," NASA-JPL's Minority Education Initiatives, June 25th, 2008.

C. S. Boxe, Volunteer at the Child Educational Center's 19th Annual Wine Tasting Benefit and Auction, Avery House, Caltech, June 14th, 2008.

C. S. Boxe, "Ask a Scientist Guy," Volunteer at JPL's Open House, Education Office, May 3rd-4th, 2008.

C. S. Boxe, Arctica Research Project for Urban Youth, NASA-JPL, "Creating an Ice Rendezvous," MOCA/LACMA Allan Kaprow Fluids Reinvention Site, MacArthur Park Lakeside, April 27th, 2008.

C. S. Boxe, "Global Warming: fact or fiction," Keynote Speaker at Earth Day, Citrus College, Glendora, CA, April 22nd, 2008.

Saiz-Lopez, A., Boxe, C. S., Sander, S. P., Chance, K., Kurosu, T. P., Liu, X., Mahajan, A., Plane, J..M. C. "Iodine chemistry in the polar boundary layer," EGU General Assembly 2008, AS3.14, lecture room Lecture Room 1 on Thursday, 17 April 2008, 13:30.

C. S. Boxe, "The Life Journey of an Atmospheric Scientist," Careers in Science Night, Garfield Elementary School, Alhambra, CA, April 16th, 2008.

C. S. Boxe , "Multiphase Modeling of Nitrate Photochemistry in the Polar Regions," Duke's Nicholas School of the Environment and Earth Sciences Earth and Ocean Sciences Division, March 18th, 2008.

C. S. Boxe and A. Saiz-Lopez, "Multiphase Modeling of Nitrate Photochemistry in the Quasi-Liquid Layer: Implications for NO_x Release from the Arctic and Coastal Antarctic Snowpack," 25th Informal Symposium on Kinetics and Photochemical Processes in the Atmosphere (2007), oral presentation.

C. S. Boxe and A. Saiz-Lopez, "Multiphase Modeling of Nitrate Photochemistry in the Quasi-Liquid Layer: Implications for NO_x Release from the Arctic and Coastal Antarctic Snowpack," 25th Informal Symposium on Kinetics and Photochemical Processes in the Atmosphere (2007), poster presentation.

A. Saiz-Lopez and C. S. Boxe, "Iodine in the Troposphere," 25th Informal Symposium on Kinetics and Photochemical Processes in the Atmosphere (2007), oral presentation.

A. Saiz-Lopez and C. S. Boxe, "Iodine in the Troposphere," 25th Informal Symposium on Kinetics and Photochemical Processes in the Atmosphere (2007), poster presentation.

A. Saiz-Lopez and C. S. Boxe, "Iodine: The Missing Halogen of Polar Tropospheric Chemistry," American Geophysical Union, San Francisco, California, Fall Meeting 2007, invited oral presentation.

C. S. Boxe and A. Saiz-Lopez, "Multiphase Modeling of Nitrate Photochemistry in the Quasi-Liquid Layer: Implications for NO_x Release from the Arctic and Coastal Antarctic Snowpack," American Geophysical Union, San Francisco, California, Fall Meeting 2007, oral presentation.

C. S. Boxe, "Surface Chemistry and Physics: Implications for the future of Terrestrial Polar Science and Planetary Science," University of Florida, Department of Chemistry, Physical Chemistry Seminar Series, December 4th, 2007.

C. S. Boxe, "Surface Chemistry and Physics: Implications for the future of Terrestrial Polar Science and Planetary Science," Colorado State University, Atmospheric Science Department Colloquium, November 29th, 2007.

C. S. Boxe, "Surface Chemistry and Physics: Implications for the future of Terrestrial Polar Science and Planetary Science," Columbia University-Lamont Doherty Earth Observatory Seminar Series, October 26th, 2007.

C. S. Boxe, "Surface Chemistry and Physics: Implications for the future of Terrestrial Polar Science and Planetary Science," Columbia University's Earth's Institute's IGERT Joint Program in Applied Mathematics and Earth and Environmental Sciences Fall 2007 Colloquium, October 25th, 2007.

A. Saiz-Lopez and C. S. Boxe, "Surface Chemistry and Physics: Implications for the future of Terrestrial Polar Science and Planetary Science," Earth and Space Science Division, Jet Propulsion Laboratory, NASA September 17th, 2007.

C. S. Boxe and A. Saiz-Lopez, "Multiphase Modeling of Nitrate Photochemistry in the Quasi-Liquid Layer (QLL): implications for NO_x release around coastal Antarctica," Gordon Research Conference on Atmospheric Chemistry, Big Sky, Montana, August 26th – 31st, 2007.

A. Saiz-Lopez and C. S. Boxe, "Iodine Explosion during Antarctic Springtime," Earth and Space Science Division, Jet Propulsion Laboratory, NASA-JPL's Postdoctoral Research Day, August 28th, 2007.

A. Saiz-Lopez and C. S. Boxe, "Iodine explosion during Antarctic springtime," Gordon Research Conference on Atmospheric Chemistry, Big Sky, Montana, August 26th – 31st, 2007.

C. S. Boxe, "Life Journey of a Young Scientist," NASA's Jet Propulsion Laboratory, Arctica Research Alliance -- Summer Campers from MacArthur Park, Pasadena, CA, July 31st, 2007.

A. Saiz-Lopez and C. S. Boxe, "Iodine explosion during Antarctic springtime," NASA's Jet Propulsion Laboratory, Planetary Ices Seminar Series, Pasadena, CA, July 13th, 2007.

A. Saiz-Lopez and C. S. Boxe, "Multiphase Modeling of Nitrate Photochemistry in the Quasi-Liquid Layer (QLL): implications for NO_x release around coastal Antarctica," NASA's Jet Propulsion Laboratory, Planetary Ices Seminar Series, Pasadena, CA, July 20th, 2007.

A. Saiz-Lopez and C. S. Boxe, "Iodine explosion during Antarctic springtime," California Institute of Technology, Geological and Planetary Science Division, Pasadena, CA, Yuk L. Yung Seminar Series, June 26th, 2007.

A. Saiz-Lopez and C. S. Boxe, "Multiphase Modeling of Nitrate Photochemistry in the Quasi-Liquid Layer (QLL): implications for NO_x release around coastal Antarctica," California Institute of Technology, Geological and Planetary Science Division, Pasadena, CA, Yuk L. Yung Seminar Series, June 26th, 2007.

C. S. Boxe, Volunteer at the Child Educational Center's 18th Annual Wine Tasting Benefit and Auction, Avery House, Caltech, June 16th, 2007.

A. Saiz-Lopez and C. S. Boxe, "Iodine explosion during Antarctic springtime," Minority Education Initiative Summer Internship Program, Jet Propulsion Laboratory, NASA, June 13th, 2007.

A. Saiz-Lopez and C. S. Boxe, Earth and Space Science Division, Jet Propulsion Laboratory, NASA "Biologically-Induced Iodine (I₂) Release from Sea-Ice During Springtime in Antarctica," The Discipline Program Scientist Monthly Planetary Science Highlight, May 18th, 2007.

C. S. Boxe, "Careers in Earth Science," Keynote Speaker at Earth Science Career Day, Citrus College, Glenora, CA April 19nd, 2007.

C. S. Boxe, "Fostering Your Scientific Curiosity," Keynote Speaker at Earth Science Career Night for High School Students at JPL, April 5th, 2007.

C. S. Boxe, FOCUS Fellow, FOCUS 2007, Georgia Institute of Technology, January 11th – 14th, 2007.

C. S. Boxe, “Grain Sizes, Surface Areas, and Porosities of Vapor-Deposited H₂O Ices Used in the Temperature Range 83.5 – 261 K: Simulation of Surfaces of Planetary Icy Surfaces,” American Geophysical Union, San Francisco, California, Fall Meeting 2006, poster presentation.

G. E. Orzechowska, R. P. Hodyss, P. V. Johnson, J. D. Goguen, A. L. Lane, C. S. Boxe, J. Kirschvink, Y. L. Yung, and I. Kanik, “Potential for Organic Chemical Evolution on Enceladus,” American Geophysical Union, San Francisco, California, Fall Meeting 2006, poster presentation.

W. D. Smythe, M. T. Leu, C. S. Boxe, B. R. Bodsgard, “Energy Transport and Crystal Growth in Frost Flowers,” American Geophysical Union, San Francisco, California, Fall Meeting 2006, poster presentation.

C. S. Boxe, “A Multi-Component View of Ice/Snow: Implications of its pH for the Overlying Boundary Layer/Planetary Science Heterogeneous Chemistry,” University of New Hampshire, Institute for the Study of Earth, Oceans, and Space, Science Seminar Series, November 16th, 2006.

C. S. Boxe, “A Journey from Terrestrial Photochemistry and Kinetics to Planetary Science Microphysics,” Georgia Institute of Technology, School of Earth and Atmospheric Sciences, Atlanta, GA, School of Earth and Atmospheric Sciences Seminar Series, September 29th, 2006.

C. S. Boxe, “Grain Sizes, Surface Areas, and Porosities of Vapor-Deposited H₂O Ices Used in the Temperature Range 83.5 – 261 K: Simulation of Surfaces of Icy Satellites and Terrestrial Snow-Covered Regions,” California Institute of Technology, Geological and Planetary Science Division, Pasadena, CA, Yuk L. Yung Seminar Series, September 26th, 2006.

C. S. Boxe, A. J. Colussi, M. R. Hoffmann, I. M. Perez, J. G. Murphy, R. C. Cohen, “Kinetics of NO and NO₂ Evolution from Illuminated Frozen Nitrate Solutions,” 232nd American Chemical Society National Meeting & Exposition, September 10-14th, 2006 San Francisco, CA.

C. S. Boxe, “Global Warming: Fact, Hypothesis, or Myth?,” NASA’s Jet Propulsion Laboratory, Pasadena, California, SURF, MURF, Space Grant, USRP, PGGURP, and CURE summer seminar series, June 21st, 2006.

C. S. Boxe, Volunteer at the Child Educational Center’s 17th Annual Wine Tasting Benefit and Auction, Avery House, Caltech, June 17th, 2006.

C. S. Boxe, “Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice/ Grain Sizes and Surface Areas of H₂O Ices Used to Simulate Surfaces of Icy Moons and Terrestrial Ice/Snow-Covered Regions,” Michigan Technological University, Environmental Science and Engineering and Geological/Mining Engineering and Sciences Departments, May 11th, 2006.

C. S. Boxe, “Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice/ Grain Sizes and Surface Areas of H₂O Ices Used to Simulate Surfaces of Icy Moons and Terrestrial Ice/Snow-Covered Regions,” Massachusetts Institute of Technology, Civil and Environmental Engineering Department, April 18th, 2005.

C. S. Boxe, "Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice/ Grain Sizes and Surface Areas of H₂O Ices Used to Simulate Surfaces of Icy Moons and Terrestrial Ice/Snow-Covered Regions," Reed College, Portland, Oregon, Chemistry Department, April^{10th}, 2006.

C. Robinson, C. S. Boxe, M. I. Guzman, A. J. Colussi, and M. R. Hoffmann, "¹⁹F NMR Probing the Acidity of Frozen Electrolyte Solutions," NSF CMS/BES (Civil and Mechanical Systems/Bioengineering and Environmental Systems) Workshop for the Advancement and Retention of Underrepresented & Minority Engineering Educators (WEE 'O6), Washington, DC, March 5th-8th, 2006.

C. S. Boxe, A. J. Colussi, M. R. Hoffmann, J. G. Murphy, P. Wooldridge, T. Betram, and R. C. Cohen, "Photochemical Production and Release of Gaseous NO₂ from Nitrate-doped Water Ice," NSF CMS/BES (Civil and Mechanical Systems/Bioengineering and Environmental Systems) Workshop for the Advancement and Retention of Underrepresented & Minority Engineering Educators (WEE 'O6), Washington, DC, March 5th-8th, 2006.

C. S. Boxe, "Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice/ Grain Sizes and Surface Areas of H₂O Ices Used to Simulate Surfaces of Icy Moons and Terrestrial Ice/Snow-Covered Regions," Michigan Technological University, Environmental Science and Engineering and Chemistry Departments, February 6th, 2006.

C. S. Boxe, A. J. Colussi, M. R. Hoffmann, J. G. Murphy, P. Wooldridge, T. Betram, and R. C. Cohen, "Photochemical Production and Release of Gaseous NO₂ from Nitrate-doped Water Ice," American Geophysical Union, San Francisco, California, Fall Meeting 2005, abstract #A21C-0865.

C. Robinson, C. S. Boxe, M. I. Guzman, A. J. Colussi, and M. R. Hoffmann, "¹⁹F NMR Probing the Acidity of Frozen Electrolyte Solutions," OASIS Workshop, Sept. 19th-20th 2005, Toronto, Canada.

C. Robinson, C. S. Boxe, M. I. Guzman, A. J. Colussi, and M. R. Hoffmann, "¹⁹F NMR Probing the Acidity of Frozen Electrolyte Solutions," SOLAS Summer School, Aug. 29th-Sept.10th 2005, Corsica, France.

C. S. Boxe, "Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice," NASA's Jet Propulsion Laboratory, Planetary Ices Seminar Series, Pasadena, California, June 24th, 2005.

C. S. Boxe, "Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice," California Institute of Technology, Pasadena, California, MURF Program Seminar Series, June 24th, 2005.

C. S. Boxe, Volunteer at the Child Educational Center's 16th Annual Wine Tasting Benefit and Auction, Avery House, Caltech, June^{18th}, 2005.

C. S. Boxe (with honorarium), "Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice," California State University, Los Angeles, California, Chemistry Department, June 3rd, 2005.

C. S. Boxe, "Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice," California Institute of Technology, Geological and Planetary Science Division, Pasadena, CA, Yuk L. Yung Seminar Series, May 24th, 2005.

C. S. Boxe, "Smog Production in Los Angeles," Centinela Valley Union High, Lawndale, CA, March 15th, 2005.

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C. S. Boxe, Y. L. Yung, M. A. Allen, R. A. West, J. I. Moses, "Hydrocarbon Chemistry in the Atmospheres of Six Extrasolar Planets," DPS Pasadena, California Meeting 2000, 23-27 October 2000.

Press Releases & Special Features

C. S. Boxe, Earth and Space Science Division, Jet Propulsion Laboratory, “Good and Bad Ozone,” NASA-JPL Main Website Blog Feature, April-May 2009.

C. S. Boxe and A. Saiz-Lopez, Earth and Space Science Division, Jet Propulsion Laboratory, NASA, “NASA Polar Chemists Snag a Mean, Green, Ozone-Eating Machine,” NASA-JPL Main Website Web Feature, **Coming Soon**, 2009.

C. S. Boxe, Earth and Space Science Division, Jet Propulsion Laboratory, “The Chemistry of Snow,” NASA-JPL Main Website Blog Feature, August-September 2008.

C. S. Boxe, One of the first Black Atmospheric and Planetary Scientist, Nansemond River High School, Suffolk, Virginia, Special Feature for Black History Month, February, 2008.

C. S. Boxe, One of the first Black Atmospheric Scientists, National Hills Elementary School, Augusta, Georgia, Special Feature for Black History Month, February, 2008.

C. S. Boxe, The Journey of a Young Black Scientist, George Washington High School, Philadelphia, Pennsylvania, Special Feature for Black History Month, February, 2008.

A. Saiz-Lopez and C. S. Boxe, Earth and Space Science Division, Jet Propulsion Laboratory, NASA, NASA-JPL Universe, October, 2007, “Postdoc Research Showcased: Iodine Explosion during Antarctic Springtime.”

A. Saiz-Lopez and C. S. Boxe, Earth and Space Science Division, Jet Propulsion Laboratory, NASA “Surface Chemistry and Physics: Implications for the future of Terrestrial Polar Science and Planetary Science,” NASA Science and Technology Solar System Exploration Science Highlight, 2007, NASA Nationwide.

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C. S. Boxe, “Celebrating Black History Month: An Earth Scientist,” NASA-JPL Feature Story on NASA-JPL’s Daily Planet, February 2007.

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C. S. Boxe, Terrell D. Neal, and William D. Hutchinson, “Morehouse Graduates at Caltech, Throughout the Years,” Morehouse Magazine, June 2003.

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C. S. Boxe, "Morehouse Graduate Heads to Caltech," Morehouse College News, May 1999.

Honors, Awards, and Proposal Funding

JPL Early Career Hire	Oct. 2008 – Present
JPL Postdoctoral Scholar	Jan. 2008 – Oct. 2008
ORAU-NASA-JPL Postdoctoral Scholar	Jan. 2006 – Jan. 2008
Most Intellectual Poster at JPL Postdoctoral Research Day	August 28 th , 2007
Carl Storm Underrepresented Minority Fellowship	August 2007
Atmospheric Chemistry Gordon Research Conference Attendee	Aug. 26 th – Aug. 31 st 2007
FOCUS Fellow, GA Tech FOCUS 2007	Jan. 11 th – 14 th , 2007
Faces of JPL	May 2007 – Present
NSF CMS/BES (WEE '06) Scholar	Mar. 5 th – 8 th , 2006
SOLAS Summer School Scholar	Aug. 29 th – Sept. 10 th 2005
Gordon and Betty Moore Fellow, California Institute of Technology	2003 – 2005
James Irvine Fellow, California Institute of Technology	1999 – 2003
Chemistry Honors, Morehouse College	May 1999

Technical Skills

- Matlab
- Sigma Plot
- Solid State NMR
- VUV Spectroscopy
- Flow Tube Reactors
- Chemiluminescence
- Ion Chromatography
- GEOS-Chem Utilization
- Laser-induced Fluorescence
- UV-VIS Spectrophotometry
- Two-photon Laser-induced Fluorescence
- Brunauer, Emmett, and Teller (BET) analysis
- Environmental Scanning Electron Microscopy (ESEM)
- Electron-Impact Ionization Mass Spectrometry
- 1-D photochemical modeling of Mars and Venus
- 1-D parameterized crust-mantle numerical modeling of volatile gas exchange and life signature budget analyses
- 1-D modeling of troposphere and 0-D Multi-phase modeling (e.g., aerosols to gas phase and condense (sea-ice, snowpack, seawater) to gas phase) via Visual Basic

References

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